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EXAMINER

LEURIG, SHARLENE L

ART UNIT

PAPER NUMBER

2879

DATE MAILED: 08/25/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | |
|-----------------------------|--------------------------------------|--|
| Offic Action Summary | Application No. 10/088,619 | Applicant(s) POLLNER, RUDOLF |
| | Examiner Sharlene Leurig | Art Unit 2879 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
 - Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 19 July 2002.
 2a) This action is **FINAL**. 2b) This action is non-final.
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 23-44 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
 5) Claim(s) _____ is/are allowed.
 6) Claim(s) 23-44 is/are rejected.
 7) Claim(s) _____ is/are objected to.
 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.
 10) The drawing(s) filed on 19 July 2002 is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 11) The proposed drawing correction filed on _____ is: a) approved b) disapproved by the Examiner.
 If approved, corrected drawings are required in reply to this Office action.
 12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
 * See the attached detailed Office action for a list of the certified copies not received.

14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
 a) The translation of the foreign language provisional application has been received.

15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

| | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____. | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s) _____. 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) 6) <input type="checkbox"/> Other: _____. |
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DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 23, 33 and 35 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Regarding claim 23, in the claim limitation "wherein a cermet (28) abuts the center electrode, the ceramic phase of which", it is unclear whether the phrase "of which" refers back to the cermet or the center electrode. After consultation of the specification and for the purposes of continued examination, the claim will be interpreted so that the phrase "of which" refers to the cermet.

Regarding claim 33, in the claim limitation "located in the interior of the insulator, the conductive phase of which is composed of carbon", it is unclear whether the phrase "the conductive phase of which" refers back to the resistor or the insulator. After consultation of the specification and for the purposes of continued examination, the claim will be interpreted so that the phrase refers to the resistor.

Regarding claim 35, it is unclear whether "the ceramic material" refers to the ceramic material of the insulator or the ceramic granulated material. For the purposes of examination, and since claim 37 is directed to the material of the ceramic insulator and therefore would be redundant in relation to claim 35 if claim 35 also referred to the material of the insulator, claim 35 will be interpreted as meaning that the ceramic granulated material is made of alumina.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 23 and are rejected under 35 U.S.C. 102(b) as being anticipated by Toya et al. (4,659,960).

Toya discloses a spark plug for an internal combustion engine, the spark plug comprising an insulator (Figure 7, element 41) composed of a sintered ceramic material (column 3, line 50) located in a shell (5), a center electrode (45) heat-fused with the insulator, and a terminal stud (2) in the insulator that is connected with the center electrode (column 6, line 27). A cermet (42) abuts the center electrode, and the ceramic phase of the cermet is composed of a similar material as the insulator, since both are made at least in part of alumina (column 3, line 50; column 5, lines 24-25), and the metallic phase of the cermet is composed of a material having good electrical conductivity, since it is made of a metal (column 5, line 26).

Regarding claims 24 and 35, the ceramic phase of the cermet is alumina (column 5, lines 24-25).

Regarding claims 26 and 38, the metallic phase of the cermet is composed of a metal from the platinum group (column 3, lines 4-6). In the claim limitation of the platinum being stable at sintering temperature, the term “stable” is interpreted as

meaning it is capable of being sintered. Since Toya discloses sintering the spark plug when the platinum phase of the cermet is in the insulator (column 5, lines 24-35), the platinum is interpreted as being "stable".

Regarding claims 27 and 39, the metallic phase is composed of platinum or a platinum alloy (column 5, lines 24-28).

Regarding claim 28, the cermet is made of a ceramic granulated material coated with a material having good electrical conductivity, that material being a metal (column 5, lines 24-27).

Regarding claim 29, the granulated material of the cermet has a granule size of 100 microns or less, which overlaps the claimed range of 90 to 150 microns.

Regarding claim 30, the cermet as a whole is compacted and therefore can be interpreted as having the metallic phase pulverized. The thickness of the metallic coating is between .1 and 20 microns, meaning the individual particle sizes can be less than 10 microns (column 5, lines 25-30).

Regarding claim 31, the ceramic granules can be as large as 100 microns in size. The metallic coating is between .1 and 20 microns in size. This means that if the metallic coating is covering as great a surface area of the granules as possible (the entire surface of each granule), the metallic coating has at most only 20% of the volume of the ceramic phase and therefore is only 16% of the total volume of the cermet. Therefore the metallic phase of the cermet may be between 10 and 15% by volume of the cermet.

Regarding claim 33, a burn-off resistor can be located in the interior of the insulator and the resistor is composed of carbon, such as a metal carbide, a carbide being a binary compound of carbon.

Regarding claim 34, Toya discloses a method for producing a spark plug using the steps of pressing a ceramic material to form the insulator (column 3, lines 41-42), which is provided with a location hole (Figure 4a, element 11'b) for a center electrode, inserting a center electrode into the location hole (column 6, lines 23-25), filling the insulator with a ceramic granulated material having a coating of good electrical conductivity (a metal) that is compacted (column 2, line 63 to column 3, line 23), and sintering the insulator (column 3, lines 23-25).

Regarding claim 37, the insulator is made of alumina (column 3, line 50).

Regarding claim 43, the material having good electrical conductivity is applied to the ceramic granules via vapor deposition, such as CVD or PVD (column 3, lines 4-8).

Regarding claim 44, the material having good electrical conductivity is applied to the ceramic granules via sputtering (column 3, lines 4-9).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 25 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Toya et al. (4,659,960) in view of Ito et al. (5,852,340).

Toya discloses a spark plug with all the limitations discussed above, and further discloses additional ceramic oxides such as silica and magnesium oxide that may be used as the ceramic powder of the cermet (column 2, line 63 to column 3, line1).

Toya lacks disclosure of sintering auxiliary agents that may be included in addition to alumina.

Ito discloses a cermet containing alumina (column 3, lines 2-5) in addition to other oxide powders, such as magnesia and silica (column 3, lines 6-7) in order to decrease the electrical resistance of the semiconductive cermet, thereby lowering the voltage required to establish the spark discharge (column 3, lines 23-27).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Toya's cermet with additional sintering agents such as magnesia or silica in order to lower the required spark voltage, as taught by Ito.

9. Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Toya et al. (4,659,960).

Toya discloses a spark plug having a insulator with a small bore diameter (Figure 6, element 31c), and therefore a small center electrode since the center electrode fits into the insulator bore (Figure 7, element 45). Toya discloses the advantage of a small insulator body reducing the event of flashover by widening the gap between the main insulator body and the side electrode (column 7, lines 13-22).

Toya lacks disclosure of a center electrode having a diameter of between 0.3 and 0.8 mm.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to make the diameter of the center electrode of Toya as small as 0.3 to 0.8 mm in order to prevent flashover by separating the main insulator body and the outer electrode as much as possible, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

10. Claims 40 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Toya et al. (4,659,960) in view of Pearce et al. (4,183,746).

Toya discloses a spark plug having ceramic granules coated with a material having a good electrical conductivity, such as platinum, as discussed above. The metal coating may be attained by vapor deposition.

Regarding claim 40, Toya lacks disclosure of the metal being coated on the ceramic granules by stirring in a diluted suspension.

Regarding claim 41, Toya lacks disclosure of a binding agent used to apply the material of good electrical conductivity to the ceramic granulated material.

Pearce teaches coating a ceramic particle with a metal such as platinum by forming a solution of ceramic particles, a metallic substance and an additive (column 1, lines 64-68) "capable of bonding together the materials of the first and second phases" (column 1, lines 30-34), combining the solution with water to dilute it (column 3, line 2)

and stirring the solution (column 3, lines 14-32). Pearce teaches that such a method is used for properly compounding a cermet having the desirable properties of ceramic and metal, i.e., the strength and ductility of a metal and the good oxidation resistance of the ceramic (column 1, lines 13-17).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Toya's method of producing ceramic granules coated with metal by stirring a diluted suspension of ceramic and metal and providing a binding agent in order to provide a properly compounded cermet with desirable properties, as taught by Pearce.

11. Claim 42 is rejected under 35 U.S.C. 103(a) as being unpatentable over Toya et al. (4,659,960) in view of Pearce et al. (4,183,746) as applied to claims 40 and 41 above, and further in view of Osaka et al. (5,055,442).

Toya discloses a spark plug having ceramic granules coated with a material having a good electrical conductivity, such as platinum, as discussed above, but lacks disclosure of a binding agent used to apply the material of good electrical conductivity to the ceramic granulated material.

Pearce teaches the use of a binding agent to enhance the coating of the ceramic granules with a metal, but lacks disclosure of an organic binding agent.

Osaka teaches the use of an organic binding agent in the process of coating a ceramic particle with a metal such as platinum in order to increase the strength of bonding of the coating (column 7, lines 14-18).

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Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Toya's method of producing ceramic granules coated with metal by providing a binding agent in order to provide a properly compounded cermet, as taught by Pearce, and to use an organic binding agent in order to increase the strength of the bond, as taught by Osaka.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sharlene Leurig whose telephone number is (703)305-4745. The examiner can normally be reached on Monday through Friday, 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel can be reached on (703)305-4794. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

Sharlene Leurig
August 15, 2003

SL

ASHOK PATEL
ASHOK PATEL
PRIMARY EXAMINER